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**FACULTY OF ENGINEERING  
DEPARTMENT OF WATER RESOURCES AND  
MINING ENGINEERING**

**WATER RESOURCES ENGINEERING PROGRAMME**

**FINAL YEAR PROJECT REPORT**

**DESIGN AND CONSTRUCTION OF A SEMI-AUTOMATED  
SOLAR POWERED MACHINE FOR REMOVING FLOATING  
WASTE IN DRAINAGE CHANNEL.**

**(CASE STUDY: NAKAMIRO DRAINAGE CHANNEL IN BWAISE)**

**BY**

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## ABSTRACT

Due to the ever-increasing World population, there has been resultant increase in resource consumption which has been manifested by increased waste generation.

Waste management is a very crucial aspect of society organization, especially in urban areas. In the case of poor waste management, toxic waste is hazardous to living animals, aquatic life and plants. When solid waste is not managed well especially in line with disposal, it accumulates in drainage channels. Accumulation of solid waste in drainage channels is associated with very detrimental effects such as clogging/blockage of the drainage channels, flooding and breakout of waterborne diseases due to stagnancy of waste water.

A semi-automated solar powered machine for removing floating waste in drainage channel will be designed and constructed to counter accumulation of solid waste in the Nakamiro drainage channel in Bwaise. The prototype operates automatically by the use of sensors and has mainly the lifting mechanism which is powered by a D.C motor to run it, getting its power from either a solar charged battery having solar panel fixed on top or an electric rechargeable battery. The lifters also carry out delivery of the lifted waste to the collection bin built on the machine. The machine executes the function of extracting trapped solid waste from the drainage channel as they are shepherded to the machine and trapped by the screen on the machine, which will solve the problem of solid waste accumulation in the channel along with its resultant evils.

This machine will effectively minimize on the accumulation of solid waste in the flowing waste water in the channel. Upon significant reduction of solid waste in the channels, blockage will also be significantly reduced or/and completely avoided and its detrimental effects as well as minimizing treatment costs of the waste water downstream.

The machine was technically evaluated and it was found to have a work rate of 9.84kg/min and an overall operational efficiency of 94.64%. Having cost Shs.1,466, 000, economic evaluation of the project was done and it was found to be viable with a Net Present value of Shs.95,925,733 and profitability index of 65.

The improved drainage channel cleaning machine was successfully designed, fabricated and assembled. I recommend the compaction and use of at least two ultrasonic sensors to obtain right bin height and ensure maximum utilization of the bin volume.

**DECLARATION**

I **DRIBAREO FIONA**, do hereby declare to the best of my knowledge, that this final year project report is an outcome of my original work and that it has never been presented to any institution of learning for an academic award. All the work contained in this report is as a result of my research except where cited.

**Signature**.....

**Date**.....

**APPROVAL**

This final year project report is submitted to the Faculty of Engineering for examination with approval from the supervisors.

**Supervisors;**

**Mr. LUBAALE SOLOMON AZARIUS**

**Mr. BAAGALA BRIAN SEMPIJJA**

**Signature.....**

**Signature.....**

**Date.....**

**Date.....**

## DEDICATION

This report is dedicated to my sponsor FAWEU Chapter and my beloved family, my dad Mr. Madra Richard, mom Mrs. Alia Beatrice, my brother Hedga, my sisters Keller, Tracy, Barbra, Mercy and friends in appreciation for their selfless care and unwavering support provided to me since childhood, and for the spirit of hard work, courage and determination instilled in me, which attributes I have cherished with firmness and have indeed made me what I am today.

## ACKNOWLEDGEMENT

In such a vast undertaking of this nature, it is impossible to reach and acknowledge every contribution and sundry. However, the temptation to acknowledge the following is irresistible.

I would like to extend my long heart felt gratitude to God Almighty for knowledge and wisdom, strength, protection, love and above all the gift of life to do the little things that I was able to do. The glory and honor is to Him forever and ever.

I am particularly indebted to MR. LUBAALE SOLOMON AZARIUS for being such a wonderful supervisor under whose guidance I was able to come up with such a research final project.

I am also thankful to my family for being supportive during this period of my project research. Special thanks go to Barasa Eddy, Wanjusi Lasto and Natkunda Loyce for lending me a helping hand as I undertake my project.

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